

- c. a change from an aldehyde to ketone structure
 d. a change of specific rotation from (+) to (-) value
13. Which of the following statement is false?
 a. Vitamins may be soluble in fats
 b. Citrus fruits are an important source of vitamin - C
 c. The deficiency of vitamin - E causes loss of blood clotting
 d. Vitamin - A is also known as Retinol
14. Which of the following is the characteristic reaction of aromatic hydrocarbons?
 a. oxidation
 b. electrophilic addition
 c. nucleophilic substitution
 d. electrophilic substitution

Exam 2069

14

Group "A"

Attempt all the questions. Tick (✓) the best answers

1. In Lessoigne's test, the formation of Prussian blue or green colouration confirms the presence of nitrogen. What is the molecular formula of that compound?
 a. $\text{Na}_4[\text{Fe}(\text{CN})_6]$
 b. $\text{Fe}_4[\text{Fe}(\text{CN})_6]$
 c. $\text{Fe}[\text{Fe}(\text{CN})_6]$
 d. $\text{Na}_4[\text{Fe}(\text{CN})_6]_3$
2. Which of the following factor increases the acidity of alcohols?
 a. + I - inductive effect
 b. - I - inductive effect
 c. + M - mesomeric effect
 d. Electromeric effect
3. Which of the following statement is false regarding chiral compounds?
 a. rotate the plane of polarised light
 b. have cis - and trans - isomers
 c. can be detected with a polarimeter
 d. have superimposed mirror image.
4. Which of the following compounds will be optically active?
 a. chloroacetic acid
 b. lactic acid
 c. meso-tartaric acid
 d. oxalic acid
5. Through which mechanism the reaction between 1 - butyl bromide and aqueous NaOH occurs?
 a. SN^1 - mechanism
 b. SN^2 - mechanism
 c. E 1 - mechanism
 d. E2 - mechanism
6. What is formed when 2-propanol is passed over heated copper to about 300°C ?
 a. Acctone
 b. Acetaldehyde
 c. Propanal
 d. Alkyl ketone
7. Which of the following is the strongest acid?
 a. Formic acid
 b. Acetic acid
 c. Oxalic acid
 d. Butyric acid
8. What are the products formed when formic acid is heated with sulphuric acid?
 a. $\text{CO}_2 + \text{H}_2$
 b. $\text{H}_2\text{O} + \text{CO}_2$
 c. $\text{H}_2\text{SO}_4 + \text{H}_2$
 d. $\text{H}_2\text{O} + \text{CO}$
9. Which of the following compound can show Cannizzaro's reaction?
 a. benzaldehyde
 b. acetaldehyde
 c. acetone
 d. formic acid
10. Which of the following compound has the highest boiling point?
 a. Ammonia
 b. Ethanamide
 d. Methylamine
 d. Ethylamine
11. The mutarotation of glucose is characterised by
 a. the presence of an intramolecular bridge structure
 b. the irreversible change from α -D to the α -D form
 c. a change from an aldehyde to ketone structure
 d. a change of specific rotation from E) to 0 value
12. The primary structure of a protein refers to
 a. whether the protein is fibrous or globular
 b. the orientation of amino acid side chains in space
 c. the amino acid sequence in the polypeptide chain
 d. the presence or absence of an α - helix
13. Which statement in the followings is false?
 a. the deficiency of vitamin - E causes loss of blood clotting

- b. citrus fruits are an important source of vitamin - C
 c. vitamin A is also known as Retinol
 d. vitamins may be soluble in fats
14. How would you convert benzene into toluene?
 a. by oxidation of benzene with ozone
 b. by Friedel-Crafts acylation of benzene
 c. by heating benzene with sulphuric acid
 d. by reacting benzene with chloromethane

Attempt all the questions.

Group "B"

6 × 7 = 42

1. What is called sp^3 -hybridisation? Justify that the shape of methane molecule is tetrahedral.
2. Explain Friedel-Crafts alkylation with mechanism.
3. What are meso compounds? Are the meso compounds optically active or inactive? Explain with an example.

OR

- What are called optically active compounds? Differentiate between enantiomers and diastereomers.
4. How would you distinguish acetaldehyde from acetone?
 5. Why formic acid is stronger than acetic acid?

OR

- How is acetic anhydride prepared? Write its reactions with ethyl alcohol and methylamine.
6. What is called keto-enol tautomerism? Describe with an example.

Group "C"

2 × 12 = 24

7. List the factors that affect the reactions of organic compounds. Explain all with an example for each factor.
8. Explain the preparation of different classes of alcohols from aldehydes and ketenes.

OR

- Why amines are more basic than ammonia? How would you separate a mixture of amines by Hofmann's method?

Exam 2070

Group "B"

6 × 7 = 42

Attempt ALL the questions:

1. What is aldol condensation? Give an example with detailed mechanism.
 2. What is called optical isomerism? Describe the optical isomerism of tartaric acid.
- OR,
3. Explain racemic mixture and racemization.
 3. Classify the alcohols. Why primary alcohols are more acidic than secondary alcohols?
 4. What are called nucleophilic addition reactions? Explain with two examples.
 5. Which one is more acidic, acetic acid or chloroacetic acid? Give also reason.
- OR,
6. How is acetamide prepared? Also write the reaction of acetamide with water, and nitrous acid.
 6. Draw an orbital diagram of benzene molecule. Describe the stability of benzene ring.

Group "C"

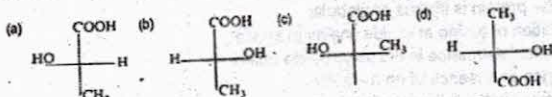
2 × 12 = 24

7. Explain the following reactions with detailed mechanism.
 (a) Claisen's condensation (b) Friedel-Crafts reaction
 8. What is hybridization? Describe the different kinds of hybridization occurs in the organic compounds with examples.
- OR,
- How is ethyl acetoacetate prepared? Explain the synthetic uses of ethyl acetoacetate.

Group "A"

14

1. What is the shape of carbonyl carbon atom in acetone molecule?
 a. Linear b. Tetrahedral c. Tetragonal d. Trigonal planer
2. The reactivity of benzene is influenced by the factor
 a. Inductive effect b. Electromeric effect c. Mesomeric effect d. Hybridisation
3. Which of the following structure is correct for S - lactic acid?



4. Which of the following alcohols is the most acidic?
 - a. ethyl alcohol
 - b. iso-propyl alcohol
 - c. secondary butyl alcohol
 - d. tertiary butyl alcohol
5. Alkyl halides have higher boiling points than alkanes, because of the
 - a. higher molecular mass
 - b. hydrogen bonding
 - c. higher density
 - d. polarity
6. Which of the following shows iodoform test?
 - a. Methanal
 - b. Methanol
 - c. Propanal
 - d. Ethanol
7. Which statement is false?
 - a. All aldehydes and ketones are colourless liquids
 - b. Aldehydes and ketones have lower boiling points than alcohols
 - c. The lower aldehydes and ketones are soluble in water
 - d. On oxidation with an acidified potassium permanganate solution aldehydes give carboxylic acids
8. What compound is formed, when acetic acid is heated with sodalime?
 - a. Acetone
 - b. Ethane
 - c. Methane
 - d. Ethanol
9. Acetamide on heating with P_2O_5 gives
 - a. Methylamine
 - b. Methyl cyanide
 - c. Ethylamine
 - d. Urea
10. Which one is the following is most basic?
 - a. Ammonia
 - b. 1° - amines
 - c. 2° - amines
 - d. 3° - amines
11. Which test is performed to identify a protein?
 - a. Tollen's test
 - b. Millon's test
 - c. β - Naphthal test
 - d. Baeyer's test
12. The sugar that yields only glucose on hydrolysis is
 - a. Maltose
 - b. Lactose
 - c. Sucrose
 - d. fructose
13. The chemical name of vitamin - C is
 - a. Succinic acid
 - b. Salicylic acid
 - c. Cinnamic acid
 - d. ascorbic acid
14. Which of the following is the characteristic reaction of benzene?
 - a. Nucleophilic substitution
 - b. Electrophilic addition
 - c. Electrophilic substitution
 - d. Oxidation

Exam 2071

Group "A"

14

Attempt ALL the questions. Tick (\checkmark) the best answers.

1. Sodium nitroprusside is used to detect sulphur in organic compounds. What is the molecular formula of sodium nitroprusside
 - a. $Na_4[Fe(CN)_5NO]$
 - b. $Na_2[Fe(CN)_5NO]$
 - c. $Na[Fe(CN)_5NO]$
 - d. $Na_3[Fe_2(CN)_5NO]$
2. What is the shape of carbonyl carbon atom of acetone?
 - a. linear
 - b. tetrahedral
 - c. trigonal pyramidal
 - d. trigonal planar
3. Which of the following compounds undergoes electrophilic substitution reaction?
 - a. Benzoic acid
 - b. Acetic acid
 - c. Propenoic acid
 - d. Ethylene
4. Which of the following statements is true?
 - a. Diastereomers are the stereoisomers which have the object mirror image relationship
 - b. a molecule with a plane of symmetry is chiral
 - c. a molecule can be optically active in the absence stereocentre
 - d. R and S configuration of a stereoisomer is related to its optical rotation (+) or (-)
5. Which one of the following is the monomer of PVC?
 - a. $CHCl_2$
 - b. $CH_2 = CHCH_2Cl$
 - c. $CH_2 = CHCl$
 - d. $CH_3CH_2CH_2Cl$
6. Which one of the following series of order follows the increasing of acidity?
 - a. 1° -alcohols < 2° -alcohols < 3° -alcohols
 - b. 2° -alcohols < 1° -alcohols < 3° -alcohols
 - c. 1° -alcohols > 2° -alcohols > 3° -alcohols
 - d. 3° -alcohols < 2° -alcohols < 1° -alcohols
7. A compound having the molecular formula, C_5H_{10} , on ozonolysis followed by reduction gives acetone and acetaldehyde. What is the given compound?
 - a. 2-methyl-2-butane
 - b. Iso-butane
 - c. Pentane
 - d. Pentene

8. Which of the following compounds gives pyruvic acid on oxidation with Fenton's reagent?
 a. Acetic acid
 b. Propionic acid
 c. Lactic acid
 d. Succinic acid
9. Which of the following compounds can be used as a tear gas?
 a. Acetyl chloride
 b. Acetic ester
 c. Ethoxyether
 d. Benzaldehyde
10. Why amines are more basic than alcohols?
 a. due to presence of a lone pair of electrons
 b. due to the stronger electronegativity of nitrogen
 c. due to the smaller size of nitrogen atom
 d. due to the weaker electronegativity of nitrogen
11. Which one of the following is not a function of proteins?
 a. provide muscles and tendons as a mean of movement
 b. provide 3 structural support for body
 c. provide hormones for antigen - antibody reaction
 d. provide skin as an outer cover
12. Which one of the following compounds reduces Tollen's reagent?
 a. Fructose.
 b. Glucose
 c. Sorbitol
 d. Sucrose
13. Which one of the following vitamins is soluble in water?
 a. vitamin-A
 b. vitamin-B
 c. vitamin-C
 d. vitamin-K
14. What will be the product formed when benzene reacts with fuming concentrated sulphuric acid?
 a. Benzene sulphuric acid
 b. Benzenehydrogen sulphate
 c. Benzoic acid
 d. Benzene sulphonate

Attempt ALL the questions.

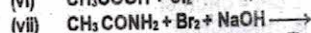
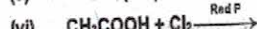
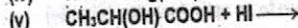
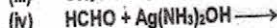
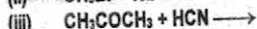
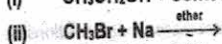
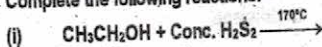
Group "B"

6×7=42

1. Identify the hybridised state of carbon atom in the given molecules. Draw an orbital diagram of a molecule of your choice. Explain also that type of hybridisation.
 (i) CH_3OH
 (ii) HCHO
 (iii) CCU

OR

- Explain these with detailed mechanism
 (i) Friedel - Craft's alkylation
 (ii) Cannizaro's reaction
2. Explain meso compounds and racemic mixtures with suitable examples.
3. What are called E_1 - and E_2 - reactions? How does these two reactions compete to each other? Write with examples.
4. Complete the following reactions:



5. Name the factors affecting the boiling points of organic compounds. Why the boiling points of alcohols are lower than carboxylic acid, but higher than carbonyl compounds?

OR

- What are amines? Give the structural formula of each primary, secondary and tertiary amines. Which one is the most basic? Explain with reason.
6. Explain the chemistry of acid anhydrides.

7. Define carbohydrates. Explain the classifications and the functions of carbohydrates with suitable examples.
8. Define and classify carboxylic acids. Give any three general methods of the preparation of acetic acid. What happens when formic acid is (i) heated with cone. Sulphuric acid, (ii) heated with sodium hydroxide?

OR

Define and classify alcohols. Give any three general methods of preparation of ethyl alcohol. What happens when ethanol is - (i) heated with copper, and (ii) treated with HI in presence of red phosphorus?

Exam 2072

Group "A"

14

Attempt ALL the Questions. Tick (✓) the best answers.

- Which is the hybridized state of ring carbon in aromatic compounds?
 - SP
 - SP²
 - SP³
 - variable
- Which reagent in the following is used to detect sulphur in inorganic compounds?
 - Ferric Chloride
 - Lead acetate
 - Ferrous sulphate
 - Potassium nitroprusside
- Which of the following compound undergoes nucleophilic substitution reactions?
 - Aldehydes
 - Alcohols
 - Carboxylic acids
 - Carbonyl compounds
- Which of the following is mainly formed, when 2-bromobutane reacts with alcoholic potassium hydroxide?
 - 2 - butanol
 - 1 - butanol
 - 2 - butane
 - 1 - butane
- Which of the following statement is correct?
 - alcohols have higher boiling points than carboxylic acids.
 - acetic acid is stronger than formic acid.
 - ketones are more reactive than aldehydes
 - acid amides are the most water soluble acid derivatives
- Which one of the following gives iodoform test?
 - acetone
 - propanal
 - methanol
 - formaldehyde
- What are the products formed when oxalic acid is heated at 150°C
 - HCOOH + CO₂
 - CO₂ + CO + H₂O
 - CO₂ + H₂O
 - HCOOH
- Which one in the followings can show tautomerism?
 - Benzophenone
 - Acetic acid
 - Benzaldehyde
 - Acetone
- What is formed when acetoacetic ester reacts with phenylhydrazine?
 - Aspirin
 - DNP
 - Antipyrine
 - 4- Methyl uracil
- Which of the following sequence of order is according to increasing of their basicity?
 - CH₃H₂ < (CH₃)₂ NH < (CH₃)₃N
 - (CH₃)₂ NH < CH₃NH₂ < (CH₃)₃N
 - (CH₃)₃ N < CH₃ NH₂ < (CH₃)₂ NH
 - (CH₃)₃ N < (CH₃)₂ NH < (CH₃) NH₂
- The primary structure of protein refers to
 - the presence or absence of an α - helix
 - the amino acid sequence in the polypeptide chain
 - the orientation of the amino acid side chains in space
 - whether the protein is fibrous or globular
- Which of the following carbohydrates will not give a red precipitate of Cu₂O when heated with Benedict's solution?
 - Glucose
 - Fructose

13. Which are the following is an example of monocyclic diterpene?
 a. Vitamin A
 b. Carotenoid
 c. Phytol
 d. Xanthin
14. Which products is formed when phenol is treated with zinc dust?
 a. Zinc phenoxide
 b. Cyclohexanone
 c. Benzoic Acid
 d. Benzene

Attempt ALL the questions.

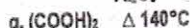
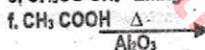
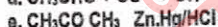
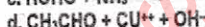
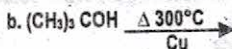
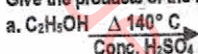
Group "B"

6×7=42

1. What is hybridisation? Explain SP² hybridisation with an example.
 2. What is optical activity? Explain the necessary conditions for a compound to show optical isomerism.

OR

- What is stereoisomerism? Differentiate between enantiomers and diastereomers with examples.
 3. What are S_N1 and S_N2 reactions? The tertiary alkyl halides undergo S_N1 reactions and the primary alkyl halides undergo S_N2 reactions. Justify it.
 4. Give the products of the following reactions:



5. Why methylene hydrogen atoms are acidic in malonic ester? How would you synthesize (i) propanoic acid, and (ii) acetoacetic acid starting from malonic ester?

OR

How is acetoacetic ester synthesized? Synthesize succinic acid and 2-methylbutanoic acid from ethyl acetoacetate.

6. What are the characteristics of aromatic compounds? Why benzene undergoes electrophilic substitution reactions whereas alkenes undergo addition reactions.

Group "C"

2×12=24

7. Name different kinds of organic reactions. Explain elimination reactions with examples. How is Saytzeff's rule applied in such reactions?
 8. What are acid derivatives? Compare the boiling points, solubility and reactivity among the acid derivatives. OR
 What are carbonyl compounds? Explain the similarities and dissimilarities between aldehydes and ketones.

(b) Chemistry III (Sc. Ed. 335) Elective Group B

Exam 2068

Group "B"

6 × 7 = 42

Attempt ALL the questions:

1. Explain, why cyclohexane is more stable than cyclopentane.
 2. What is electrophilic substitution reaction? Explain, why nitrobenzene is meta-directing in electrophilic substitution reaction.

OR, Explain any two test reactions that distinguish phenols from alcohols.

3. How is potassium dichromate prepared? Write its uses in laboratory.
 4. Define vapour pressure and explain the effect of temperature on vapour pressure.

OR, State and explain Ostwald's dilution law.

5. State and explain Faraday's second law of electrolysis.

6. What are semiconductors and superconductors? Explain the applications of superconducting materials.

Group "C"

2 × 12 = 24

7. How would you prepare benzoic acid from benzene? Explain the chemical reactions of benzoic acid involving -COOH group.

8. Give the electronic configuration of alkali metals. Explain the general properties of alkali metals.

OR, Derive kinetic gas equation, $PV = \frac{1}{3} mn C^2$.

Group "A"

14

- Which of the following theory well explains the stability of cyclopropane?
a. Baeyer's strain theory b. Sachse - Mohr's theory
c. Molecular orbital theory d. Valence bond theory
- Which product is formed on the reduction of benzaldehyde?
a. Benzanone b. Toluene c. Benzyl alcohol d. Phenol
- Aromatic sulphuric acids are
a. white amorphous solids b. white crystalline solids
c. syrupy liquids d. water insoluble solids
- Which of the following is an azo-dye?
a. Malachite green b. fluorescein c. Mordant green 4 d. Methyl orange
- The nuclei of same mass number but different atomic number are called
a. Isotopes b. Isobars c. Isomers d. Isotones
- The spherical shape of liquid drops is explained by the property
a. Surface tension b. Viscosity c. Vander Wall's force d. Density
- Which of the following equation define the law of mass action for a general reversible reaction, $A + B \rightleftharpoons C + D$?
a. $K_{eq} = \frac{[A][B]}{[C][D]}$ b. $K_{eq} = \frac{[C][D]}{[A][B]}$ c. $K_{eq} = \frac{[A][B]}{[CD]}$ d. $K_{eq} = \frac{[C][D]}{[AB]}$
- Which of the following statement is true?
a. In an aqueous solution, NH_4Cl shows basicity
b. In water, CH_3COONa gives acidic solution
c. In water, $CuSO_4$ shows acidity
d. NH_4OH is a strong base
- The reaction taking place at the anode in electrolysis is
a. Ionisation b. Dissociation c. Reduction d. Oxidation
- Fe_2O_3 is an example of
a. Diamagnetic b. Paramagnetic c. Ferromagnetic d. Ferrimagnetic
- The molecular formula of Tetrammine copper (II) sulphate is
a. $[Cu(NH_3)_4]SO_4$ b. $[Cu(NH_3)_5]SO_4$ c. $[Cu_2(NH_3)_4]SO_4$ d. $[Cu(NH_3)_6]SO_4$
- Which of the following is a set of p-block elements?
a. BA, C, N, Ne b. Zn, Si, Al, S c. Br, Ar, Pb, Ba d. P, Si, Kr, Al
- The steps involved in gravimetric analysis are
a. Solution, precipitation, filtration, ignition
b. Filtration, pre-precipitation, co-precipitation, weighing
c. Solution, dilution, filtration, ignition
d. Precipitation, filtration, dilution, constant weighing
- Which metal is extracted by Mond's process?
a. Nickel b. Cobalt c. Iron d. Gold

Exam 2069

Group "A"

14

Attempt all the questions. Tick (✓) the best answers.

- Which statement in the followings is true?
a. Half-chair form of cyclohexane is more stable than boat form
b. Cyclohexane is more reactive than cyclopentane
c. Baeyer's strain theory cannot explain the stability of cyclohexane
d. Cycloalkanes are aromatic hydrocarbons
- Which product is formed when salicylic acid reacts with fuming nitric acid?
a. Picric acid b. Salicylaldehyde
c. Benzoic acid d. Ortho-nitrophenol
- Preparation of a diazonium salt from a primary aromatic amine is known as
a. Coupling reaction b. Corey-house synthesis
c. Claisen's condensation d. Diazotisation

4. Which of the following is an azo-dye?
 a. Malachite green
 b. Methyl orange
 c. Phenolphthalein
 d. Fluorescein
5. Which of the following nuclear particle produces a binding force inside the nucleons of an atom?
 a. Protons
 b. Positrons
 c. Mesons
 d. Neutrons
6. Which of the following properties cause the spherical shape of Liquid drops?
 a. viscosity
 b. surface tension
 c. density
 d. intermolecular force
7. Which of the following equation defines the law of mass action for
 a. $K_{eq} = \frac{[C][D]}{[A][B]}$
 b. $K_{eq} = \frac{[C][D]}{[AB]}$
 c. $K_{eq} = \frac{[A][B]}{[CD]}$
 d. $K_{eq} = \frac{[A][B]}{[C][D]}$
8. Which of the following mixtures acts as a buffer solution?
 a. $NH_4OH + NaCl$
 b. $NH_4OH + HCl$
 c. $CH_3COOH + NaOH$
 d. $NH_4OH + NH_4Cl$
9. What is the unit of equivalent conductance?
 a. $Ohm^{-1} cm^2 mol^{-1}$
 b. $Ohm^{-1} cm^1$
 c. $Ohm^{-1} cm^2 equiv^{-1}$
 d. $Scm^2 mol^{-1}$
10. Fe_3O_4 is an example of
 a. paramagnetic
 b. diamagnetic
 c. ferromagnetic
 d. ferromagnetic
11. The molecular formula of tetrammine copper (II) sulphate is
 a. $[Cu(NH_2)_4] SO_4$
 b. $[Cu(NH_3)_4]SO_4$
 c. $[Cu_2(NH_2)_4]SO_4$
 d. $[Cu(NH_3)_4]_2 SO_4$
12. Which of the following statement is false?
 a. The metallic property increases as $K < Na < Li$
 b. The metallic property decreases as $K > Na > Li$
 c. The metallic property increases $Mg < Ca < Be$
 d. The metallic property decreases $Ca > K > Na$
13. How many gram of Na_2CO_3 is present in 100cc. of its decinormal solution?
 a. 0.53 gm
 b. 5.3 gm
 c. 1.06 gm
 d. 10.6 gm
14. Chromatography is a valuable technique for the separation and purification of
 a. samples of colour mixture
 b. samples of liquid mixture
 c. a small samples of mixture
 d. a small samples of organic compounds

Group "B"

6×7=42

1. Why chair-form cyclohexane is more stable than boat form cyclohexane?
 2. What is an electrophilic substitution reaction? Explain why nitrobenzene is meta-directing in electrophilic substitution reaction.

OR

3. Explain, in brief the cleansing action of soaps.
 4. What is red ox titration? Explain with an example.
 5. State and explain Ostwald's dilution law.
 6. What is viscosity? How does the temperature affect on viscosity?
 7. Define specific and equivalent conductance. Why specific conductance decreases while equivalent conductance increases with dilution?

OR

State and explain Faraday's second law of electrolysis.

Group "C"

2×12=24

7. How is benzoic acid prepared from benzene? Explain the chemical reactions of benzoic acid involving-COOH group.
 8. Derive kinetic gas equation $PV = \frac{1}{2}mnc^2$

OR

What are S- and P-block elements? Explain the general properties of IA group elements.

Attempt ALL the questions:

1. Explain the stability of cyclohexane according to Sachse-Mohr's theory.
 2. Why phenols are more acidic than alcohols? Explain.
- OR,
3. Explain, in brief the cleansing action of soaps.
 3. Write differences between nuclear fission reaction and nuclear fusion reaction.
- OR,
4. Give the structure of potassium permanganate. Explain the laboratory uses of potassium permanganate.
 4. What is redox titration? Explain with an example.
 5. What is surface tension? How does the temperature affect surface tension?
 6. Define specific and equivalent conductance. Why former decreases while latter increase with dilutions?

Group "C"

2 × 12 = 24

7. State and explain the assumptions of kinetic theory of gas. Deduce the Boyle's law from the kinetic theory of gas.
 8. What are S- and P- block elements? Explain the general properties of VIIA group elements.
- OR,
- a. What happens when salicylic acid is heated with zinc dust?
 - b. Why nitration of benzoic acid gives m-nitro benzoic acid?
 - c. How would you synthesize benzoic acid from benzene?

Group "A"

14

1. Which of the following cycloalkanes should be most stable according to Baeyer's strain theory?
a. Cyclopropane b. Cyclobutane c. Cyclopentane d. Cyclohexane
2. Which of the following compounds is formed when acetophenone is oxidized with an acidified potassium dichromate?
a. Phenol b. Benzaldehyde c. Benzoic acid d. Benzophenone
3. Nitrobenzene react with a mixture of conc. Nitric acid and sulphuric acid gives
a. O-dinitrobenzene b. m-dinitrobenzene c. p-dinitrobenzene d. 1,3,5-trinitrobenzene
4. Which of the following reagents is used to prepare benzene diazonium chloride from aniline?
a. KMnO_4 b. LiAlH_4 c. $\text{NH}_2\text{NH}_2 + \text{KOH}$ d. $\text{NaNO}_2 + \text{HCl}$
5. What is the nuclear particle that produces a binding force inside the nucleons of an atom?
a. Protons b. Positrons c. Neutrons d. Mesons
6. Which of the following laws is applicable to steam distillation?
a. Boyle's Law b. Charles's Law
c. Graham's Law of diffusion d. Dalton's law of partial pressure
7. Which statement in the following is true?
a. At equilibrium state, the energy of activation of the reactants is equal to the energy of activation of the products
b. At equilibrium state the rate constant of the forward reaction is equal to the rate constant of the backward reaction
c. At equilibrium state the rate of forward reaction is equal to the rate of the backward reaction
d. At equilibrium state the concentration of the reactants is equal to the concentration of the products
8. Which of the following mixtures acts as a buffer solution?
a. $\text{CH}_3\text{COOH} + \text{CH}_3\text{COONa}$ b. $\text{NaOH} + \text{CH}_3\text{COONa}$
c. $\text{NH}_4\text{OH} + \text{NaCl}$ d. $\text{HCl} + \text{NaCl}$
9. What is the unit of specific conductance?
a. $\text{Ohm}^{-1} \text{cm}^2 \text{mol}^{-1}$ b. $\text{Ohm}^{-1} \text{cm}^{-1}$ c. $\text{Ohm}^{-1} \text{cm}^2$ d. $\text{S cm}^2 \text{equiv}^{-1}$
10. Which of the following is true solid?
a. KCl b. HCl c. Glass d. Rubber
11. The name of $\text{K}_4[\text{Fe}(\text{CN})_6]$ is
a. potassium hexaferrocyanate b. potassium hexacyanoferrate (II)
c. potassium hexacyanoferrate (III) d. potassium ferrocyanide
12. Hydrogen peroxide can act as
a. an oxidizing agent b. reducing agent

- c. dehydrating agent d. both oxidizing agent and reducing agent
13. How much gram of oxalic acid crystals is present in 100cc. of its decinormal solution?
 a. 0.63 gm b. 6.3 gm c. 0.063 gm d. 1.26 gm
14. Chromatography is a valuable technique for the separation and purification of
 a. samples of liquid mixtures b. small samples of mixtures
 c. samples of colour mixtures d. samples of organic compounds

Exam 2071

Group "A"

14

Attempt ALL the questions. Tick (✓) the correct answers.

1. Why the chair form of cyclohexane is more stable than the boat form of cyclohexane?
 a. because chair form has less angle strain than boat form
 b. because chair form has less angle strain and torsional strain
 c. because chair form has less dipole - dipole interaction
 d. because boat form has torsional strain
2. Which one of the following carboxy lie acids is most acidic?
 a. p-nitrobenzoic acid b. p-touleic acid
 c. benzoic acid d. salicylic acid
3. Which product is formed when benzene sulphonic acid is heated with steam?
 a. benzoic acid b. benzene sulphonate
 c. benzene d. benzaidehyde
4. Which of the following is an azo-dye?
 a. methyl orange b. fluorescein
 c. malachite green d. mordant green
5. The nuclei of same mass number but different atomic number are called.
 a. isotopes b. isomers
 c. isobars d. isotones
6. Which of the following acids give soft soaps when reacting with KOH?
 a. adipic acid b. palmitic acid
 c. stearic acid d. oleic acid
7. Which one of the followings is used as a titrant to estimate the amount of copper in copper sulphate solution?
 a. hypo solution b. potassium permanganate solution
 c. potassium dichromate solution d. potassium iodide solution
8. What is the name of the cation $[Cu(NH_3)_4]^{2+}$?
 a. copper (II) tetrammine ion b. cupric tetrammine ion
 c. tetrammine cupric ion d. tetrammine copper (II) ion
9. Which of the given series represents the decreasing order of their atomic sizes?
 a. $Cl > Br > F$ b. $I > Cl > Br$
 c. $Br > I > Cl$ d. $Br > Cl > F$
10. Which formula is used to determine the surface tension of liquids?
 a. $r_1 = (n_1 d_1 / n_2 d_2) \times r_2$ b. $r_1 = (n_2 d_1 / n_1 d_2) \times r_2$
 c. $r_2 = (n_1 d_1 / n_2 d_2) \times \frac{1}{r_1}$ d. $r_1 = (n_2 d_1 / n_1 d_2) \times \frac{1}{r_2}$
11. Which of the following laws is applicable to steam distillation?
 a. Boyle's law b. Charle's law
 c. Dalton's law of partial pressure d. universal law of gas
12. Which of the following solid compounds has orthorhombic shape?
 a. $BaSO_4$ b. NaCl
 c. $CaCO_3$ d. NH_4Cl
13. What is the normality of NaOH solution in which 8 gons of NaOH crystals dissolved in 400 cc. of its solution?
 a. 0.2 N b. 0.4N
 c. 0.8N d. 0.5N
14. Which one of the followings is a weak electrolyte?
 a. $MgCl_2$ b. HNO_3
 c. CH_3COONa d. H_2CO_3

Attempt ALL the questions.

Group "B"

6×7=42

1. What are conformational isomers? Explain the conformational analysis of cyclohexane.
 2. What are aromatic amines? Write down the ring substitution reactions of aniline.
 3. Define and explain nuclear fission reactions and nuclear fusion reactions.
 4. Define viscosity. How would you determine viscosity using Ostwald's viscometer?
- OR
5. Explain in brief, the chemistry of hydrogen peroxide;
 6. State and explain Ostwald's dilution law.
 7. Explain the method of precipitation from homogeneous solution. Define also the terms coprecipitation and post-precipitation.

What are redox titrations? Explain the principles of redox titrations with examples.

Group "C"

2×12=24

7. Derive kinetic gas equation, $PV = \frac{1}{3} mNc^2$.
8. Define and explain law of mass action based on the molecular collision theory.
8. What are s- and p- block elements? Explain the general properties of IIA group elements.

Exam 2072

Group "A"

14

Attempt ALL the questions.

Tick (V) the correct answers.

1. Which of the following sequence of conformation of cyclohexane can explain the stability order?
a. twist-boat > boat > half-chair
b. chair-form > half-chair > boat
c. chair-form > boat > twist-boat
d. twist-boat > half-chair > boat
2. Which of the following substituent group acts as an ortho-spara director?
a. -COOH
b. -NH₂
c. -NO₂
d. -CHO
3. Which of the following compounds gives coupling test?
a. Benzaldehyde
b. Aniline
c. Benzoic acid
d. Nitrobenzene
4. Which one of the following acids gives soft soaps with reacting KOH?
a. Adipic acid
b. Palmitic acid
c. Stearic acid
d. Oleic acid
5. What are called for the nuclei having same mass number but different atomic number?
a. Isotones
b. Isomers
c. Isotopes
d. Isobars
6. What is the molecular formula of tetra-ammine copper (II) sulphate?
a. $[Cu(NH_3)_4]2SO_4$
b. $[Cu_2(NH_3)_4]SO_4$
c. $[Cu(NH_3)_4]SO_4$
d. $[Cu(NH_2)_4]SO_4$
7. Which one in the followings is the largest in size?
a. F
b. K
c. I
d. Rb
8. Which one in the followings is a phenol?
a. Picric acid
b. O-hydroxy-sulfonic acid
c. Anthracene
d. Salicylaldehyde
9. Which of the followings can act as both-oxidizing agent and reducing agent?
a. Hydrogen peroxide
b. Hydrogen sulphide
c. Sodium thiosulphate
d. Potassium iodide
10. How much gram of sodium carbonate is necessary to prepare 200 cc. of its decinormal solution?
a. 0.053 gm
b. 0.53 gm
c. 5.3 gm
d. 1.06 gm
11. Which of the following laws is applicable to steam distillation?
a. Charles's law
b. Boyle's law
c. Universal gas law
d. Law of partial pressure
- 12.3 Which of the following liquids has the highest surface tension?
a. Alcohol
b. Glycerol
c. Phenol
d. Acid

13. Which of the following solids has orthorhombic shape?
 a. NaCl
 b. CaCO_3
 c. NH_4Cl
 d. BaSO_4
14. Which statement in the followings is true?
 a. At equilibrium state, the concentration of the reactants is equal to the concentration of the products
 b. At equilibrium state, the energy of activation of the reactants is equal to the energy to the energy of activation of the products.
 c. At equilibrium state, the rate constant of forward reaction is equal to the rate constant of backward reaction.
 d. At equilibrium state, the rate of forward reaction is equal to the rate of backward reaction.

Attempt ALL the questions.

Group "B"

6×7=42

- What is 1, 3 - diaxial interaction? Explain, why equatorial chair form of cyclohexane is more stable than its axial chair form.
- Define aromatic carboxylic acids. Explain the effect of substituents on the acidity of benzoic acid.
- What is called hypo solution? How is it prepared? Explain the uses of this solution.
- What are alkali metals? Explain the complex compounds of alkali metals.

OR

What are p-block elements? Explain the general properties of VIIA group elements.

- What are indicators? Explain the principle of acid-base indicators.
- State and explain Faraday's laws of electrolysis.

OR

Define chromatography. Describe partition chromatography.

Group "C"

2×12=24

- Define vapour pressure. What is the effect of temperature on vapour pressure? Explain the effect of vapour pressure on the boiling points.
- Define common-ion effect. Explain the uses of common-ion effect in qualitative analysis of inorganic salts.
- Define aromatic compounds. Give two general methods of the preparation of benzoic acid. What happens when benzoic acid is-
 (i) heated with soda lime.
 (ii) treated with conc. HNO_3 in presence of conc. H_2SO_4

(c) Physics II (Sc. Ed. 333) Elective 1

Exam 2068

Group "B"

6×7=42

Attempt ALL the questions:

- What do you mean by a stationary wave? Discuss the possible modes of vibration of a stretched string.
 - What is Doppler effect? Obtain an expression for the apparent frequency of the note when source is moving away from the stationary listener.
 - State Huygen's principle and use it to explain the phenomenon of refraction of light.
- OR,
- Explain the formation of Newton's rings in reflected light. Prove that in reflected light the diameters of the dark rings are proportional to the square of natural numbers and diameters of bright ring are proportional to the square root of odd numbers.
 - Discuss the polarization produced by the reflection of light and show that $\mu = \tan p$; where symbol carry their usual meanings.
 - Describe wheat stone bridge circuit and deduce the condition for balance using Kirchhoff's law.
 - Define magnetic flux and magnetic flux density. Derive the relation $F = H \tan \theta$; where symbols carry their usual meanings.
- OR,
- Light of wavelength 6000 \AA falls on a photosensitive plate of work function 1.9 eV . Find (i) energy of the photon in evaluation, (ii) kinetic energy of the photoelectrons emitted and (iii) stopping potential. ($h = 6.62 \times 10^{-34} \text{ JS}$, $C = 3 \times 10^8 \text{ m/s}$)

Group "C"

2×12 = 24

7. State and explain Biot – Savart law. Use it determine the magnetic field intensity due to a current carrying circular coil at any point on its axis.
- OR, Describe the cosmological theories of the universe in relation to
(a) Pulsating theory (b) the Big-Bang theory and (c) Steady state theory
8. (a) Explain P-type and N-type semiconductor
(b) What is zener diode? Describe how a zener diode is used as a voltage regulator.

Group "A"

14

1. A pipe closed at one end and open at the other end will give
a. all the harmonics
b. all odd harmonics
c. all even harmonics
d. only first and second harmonics
2. Energy is not carried by
a. transverse progressive waves
b. longitudinal progressive waves
c. stationary waves
d. electromagnetic waves
3. Which one of the following is spacing between successive maxima (or minima) in an interference experiment?
a. $\lambda d/D$
b. dD/λ
c. $\frac{d}{4D}$
d. $\frac{D}{d}$
4. When light is incident at polarizing angle, which is completely polarized
a. reflected light
b. refracted light
c. transmitted light
d. both 'b' and 'c'
5. In the case of diffraction, there is a superposition of two disturbances coming from
a. same wave front
b. different wave fronts
c. different sources
d. sometimes same and sometimes different wave fronts
6. Which one of the following is the unit of resistivity?
a. $\Omega \cdot m$
b. Ω/m
c. Ω/m^2
d. $\Omega \cdot m^2$
7. Increasing the charge on the plates of a capacitor means
a. increasing the capacitance
b. increasing the P.d between two plates
c. increasing dielectric strength
d. both 'b' and 'c'
8. Which of the following is of shortest wavelength?
a. x-rays
b. r-rays
c. microwaves
d. radiowaves
9. If the temperature increase the conductivity of semiconductor
a. increases
b. decreases
c. does not change
d. first decreases and then increases
10. Which of the following is an evidence for the expansion of the universe?
a. birth of pulsars
b. red shift
c. blue shift
d. birth of quasars
11. P-type semiconductor has
a. more free electrons
b. more holes
c. equal no. of electrons and holes
d. only hole without any electrons at room temp
12. Henry is the unit of
a. coefficient of self-induction
b. coefficient of mutual induction
c. magnetic flux
d. both 'a' and 'b'
13. Which of the following is the minimum energy required to eject an electron from metal surface?
a. atomic energy
b. mechanical energy
c. electrical energy
d. work-function
14. The direction of force produced in charge particle moving in magnetic field is given by
a. right hand thumb rule
b. Fleming's left hand rule
c. Fleming's right hand rule
d. Ampere's law

Exam 2069

Group "A"

14

Attempt all the questions. Tick (✓) the best answers.

1. Which of the following phenomenon causes reverberation?
a. interference
b. diffraction
c. refraction
d. reflection
2. The distance between any two successive nodal points in a stationary wave is
a. $\lambda/4$
b. $\lambda/2$
c. λX
d. integral multiple of λX

3. The length of an open organ pipe is e and velocity of sound is V , then the frequency of fundamental note is
- a.
 - b.
 - c.
 - d.
4. Which of the following phenomenon cannot be explained by Huygen's wave theory?
- a. Refraction
 - b. Reflection
 - c. Diffraction
 - d. Origin of spectra
5. The bending of light rays round the corners of an obstacle is called
- a. interference
 - b. diffraction
 - c. refraction
 - d. polarization
6. Conductivity is the
- a. reciprocal of current density
 - b. reciprocal of resistivity
 - c. reciprocal of resistance
 - d. same as current
7. Which of the following is same in each capacitor connected in series combination?
- a. charge
 - b. potential
 - c. charge and potential
 - d. capacitance
8. The wavelength of X-rays is of the order of
- a. 10^{-2} m
 - b. 10^{-5} m
 - c. 10^{-10} m
 - d. 10^{-12} m
9. Which of the following rule that determines the direction of induced emf in a moving conductor inside a uniform field?
- a. Fleming's right hand rule
 - b. Fleming's left hand rule
 - c. Ampere's law
 - d. Biot-Savart's law
10. Above curie temperature a ferromagnetic substances becomes
- a. paramagnetic
 - b. diamagnetic
 - c. non-magnet
 - d. strongly ferromagnetic
11. If the kinetic energy of a moving particle is E , then the de-Broglie wave length is
- a.
 - b.
 - c.
 - d.
12. Doped semiconductors are called
- a. intrinsic semi-conductors
 - b. extrinsic semiconductors
 - c. super conductors
 - d. perfect conductors
13. Thin films of oil and soapy water owe their brilliant colours because of
- a. fusion
 - b. interference
 - c. diffraction
 - d. polarization
14. At what angle should an unpolarized beam be incident on a crystal of $\mu = \sqrt{3}$ so that reflected beam is polarized?
- a. 45°
 - b. 60°
 - c. 90°
 - d. 0°

Attempt all the questions.

Group "B"

6×7=42

1. Show that for the same length of the pipe, the fundamental frequency in the case of an open end pipe is double the fundamental frequency of a closed end pipe.
2. The equation of a plane progressive wave is given by the equation $y = 10 \sin \pi(t - 0.05x)$; where y and x are in cm and t in seconds. Calculate the amplitude, frequency, wavelength and velocity wave.
3. What is the difference between wave front and wavelets? Use Huygen's principle to verify the phenomenon of reflection of light.

OR

- 134ne the polarizing angle. Show that the reflected ray and refracted ray are perpendicular to each other, when the light is incident at the polarizing angle.
4. What is electromagnetic spectrum? Describe briefly the main division of electromagnetic spectrum in terms of their properties and uses.
 5. Define capacitance of a capacitor. Obtain an expression for the energy stored by charged capacitor.

OR

A house is fitted with 10 lamps each 60w and 4 fans each taking a current of 0.25 A. The energy is supplied at 220V. If the lamps are lighted for 5 hours a day and fans work for 6 hours a day find the bill for 30 days; if the cost of energy is at the rate of Rs. 7.30 per unit.

6. Describe the formation of P-N junction diode and explain briefly its biasing.
Group "C" 2×12=24
7. What is interference of light? Under what conditions can it take place? Derive an expression for the fringe width in the interference pattern and show that the dark and bright fringes are of equally spaced.

OR

Describe the Stars in terms of

- (a) Stellar distance (b) Brightness
(c) Stellar spectra (d) Birth and death

8. (a) What is photoelectric effect? Discuss Einstein's photoelectric equation, Define various terms involved in it.
(b) State and explain Heisenberg's uncertainty principle. Show that the electrons cannot exist in the nucleus.

Exam 2070

Group "B"

6×7=42

Attempt ALL the questions:

1. Explain the terms free, damped and forced oscillations. Give some consequences of resonant vibration.
2. What is a stationary wave? Derive an expression for the n^{th} overtone of an open end pipe.
3. What is interference of light? Explain interference in thin films due to reflected light.
4. A plane transmission grating having 600 lines/cm is used to obtain a spectrum of light from a sodium lamp in the second order. Calculate the angular separation between the two sodium lines whose wavelengths are 5890 Å and 5896 Å.

(Give: $1\text{Å} = 1 \times 10^{-8}\text{ cm}$)

5. Elucidate dielectric of a medium. Discuss the action of dielectric on capacitance and potential difference between two plates of capacitor.
- OR, An observer travels with constant velocity of 30m/s towards a distant source of sound, which has a frequency of 1000 Hz.
Calculate the apparent frequency of the sound heard by the observer. What frequency is heard after passing the source of sound? (Assume velocity of sound = 330 m/s)
6. (a) Define self-induction and mutual induction.
(b) What is a neutral point? Locate the positions of neutral points when the magnet is placed with its north pole towards south.

Group "C"

2×12=24

7. Describe the theory of deflection of moving electrons in electric field, magnetic field and cross field.
OR, Describe the formation of P-type and N-type semiconductors. Also, explain the working of a PN diode when it is forward biased and reverse biased.
8. Explain the following terms:
(a) Pulsars and Quasars (b) Stellar spectra
(c) Hubble's law (d) Black hole

Group "A"

14

1. Resonance is a special case of
a. forced vibrations b. damped vibrations
c. natural vibrations d. free vibrations
2. Which of the following is the threshold intensity of sound?
a. 10^{-12} Wm^{-2} b. $10^{-14}\text{ W}^{-1}\text{m}^{-1}$ c. 10^{-12} Wm^{-3} d. 10^{-2} Wm^{-2}
3. The expression relating polarizing angle i_p and refractive index μ is
a. $\mu \sin i_p = 1$ b. $\mu \tan i_p = 1$ c. $\mu \cot i_p = 1$ d. $\mu \operatorname{cosec} i_p = 1$
4. As the slit separation in Young's double slits experiment increases, the fringe will become
a. circular in shape b. wider c. narrower d. triangular
5. Which of the following rays are not the portion of electromagnetic spectrum?

- a. X-rays b. microwaves c. α -rays d. radiowaves
6. As the dielectric medium is inserted between two plates of a capacitor, its capacitance
a. increases b. decreases c. remains constant d. becomes zero
7. Kirchoff's second law is based on the principles of conservation if
a. charge b. energy c. momentum d. mass
8. The voltage sensitivity of a galvanometer will increase if
a. radius of coil is decreased b. no. of turns in coil is decreased
c. a weak magnetic field is used d. a coil of low resistance is used
9. Eddy current do not cause
a. damping b. heating c. sparking d. energy loss
10. On which following law deflection magnetometer depends?
a. Ampere's law b. Biot - Savrt's law c. Tangent law d. Kirchoff's law
11. When an electron of mass m is accelerated through a potential difference of V volts then the speeds of electron becomes
a. $\sqrt{\frac{eV}{m}}$ b. $\sqrt{\frac{2eV}{m}}$ c. $\sqrt{\frac{eV}{2m}}$ d. $\sqrt{\frac{m}{2eV}}$
12. In a reverse biased condition depletion layer of P - n junction diode offers
a. low resistance b. high resistance c. zero resistance d. both (a) and (c)
13. Loudness of sound is measured in
a. decibel b. hertz c. kilohertz d. megahertz
14. A light signal (Photon) cannot escape from the surface of a
a. neutron star b. black hole c. white dwarf d. red giant

Exam 2071

Group "A"

14

Attempt ALL the questions. Tick (✓) the correct answers.

1. The distance between two successive nodal points in a stationary wave is
a. $\lambda/4$ b. $\lambda/2$
c. λ d. $n\lambda$
2. The loudness of sound depends upon
a. wavelength b. frequency
c. amplitude d. periodicity
3. Which of the following phenomenon is not explained by Huygen's construction of wavefront?
a. refraction b. reflection
c. diffraction d. origin of spectra
4. Which of the following wavelength falls in X-rays region?
a. 1\AA° b. 10\AA°
c. 10^{-2}\AA° d. 10^{-3}\AA°
5. The energy of a conductor of capacitance C and having charge Q is given by
a. $\frac{1}{2} QC$ b. $\frac{Q^2}{2C}$
c. $\frac{1}{2} CQ^2$ d. $\frac{2C^2}{Q}$
6. The bending of beam of light around corners of obstacles is called
a. reflection b. diffraction
c. refraction d. interference
7. Kirchoff's loop rule is based on the principle of conservation of
a. charge b. energy
c. momentum d. mass
8. The magnetic lines of forces produced around current carrying straight conductor are
a. elliptical b. circular
c. oval d. parabolic
9. A transformer works on the principle of
a. converter b. inverter
c. mutual induction d. self-induction
10. The ratio of intensity of magnetization and magnetizing field is called

- a. permeability
c. magnetic intensity
- b. magnetic induction
d. magnetic susceptibility
11. Emission of electrons by heating metals is known as
a. photoelectric emission
c. thermionic emission
- b. field emission
d. secondary emission
12. The uncertainty in the position of a particle is equal to the de-Broglie wavelength λ . The uncertainty in its momentum will be
a. $\frac{h}{\lambda}$
c. $\frac{1}{h}$
- b. $\frac{2h}{3\lambda}$
d. $\frac{3\lambda}{2h}$
13. The star whose original mass is five times the solar mass and which has very high value of g is called
a. White dwarf
c. Neutron star
- b. Black hole
d. Nebula
14. At absolute zero, germanium behaves of a
a. conductor
c. super conductor
- b. insulator
d. ferromagnetic substance

Attempt ALL the questions.

Group "B"

6×7=42

1. What is resonance? Describe an experiment giving the necessary theory by which the speed of sound in air may be determined using resonance air column method?
2. Distinguish between musical sound and noise. A car travelling at 20m/s sounds its horn which has a frequency of 600Hz. What frequency is heard by a stationary distant observer as the car approaches? What frequency is heard after the car has passed? (velocity of sound = 340m/s)
3. Write down the conditions for observable interference. Deduce an expression for the fringe width in the interference pattern and show that the dark and bright fringes are of equally spaced.

OR

- i. Show that $\mu = \tan \rho$; where symbols carry their usual meanings.
- ii. If a diffraction grating produces its third-order bright band at an angle of 78.4° for light of wavelength 681nm; find (a) the no. of slits per centimetre for the grating; (b) the angular location of the first - order bright band.
4. Define capacitor and capacitance. Derive an expression of capacitance of co-axial cylindrical capacitor.
5. Explain the construction and principle of potentiometer. Discuss how would you use it to determine the internal resistance of a cell.
6. (a) Explain the term self-induction and its inductance,
(b) Distinguish between diamagnetic, paramagnetic and ferromagnetic materials by giving their four important properties.

OR

- (a) Define the term threshold frequency, work-function and stopping potential.
(b) An electron having 450 eV of energy moves at right angles to a uniform magnetic field of flux density 1.50×10^{-3} T.
Find the radius of its circular orbit.

Assume that the ratio $e/m = 1.76 \times 10^{11}$ Ckg⁻¹

Group "C"

2×12=24

7. (a) Determine the magnetic field intensity due to a current carrying straight conductor by using Ampere's law.
(b) Explain the construction and theory of moving coil galvanometer.
8. Explain the following terms:
(a) Pulsars and quasars
(c) Black hole
- (b) Hubble's law
(d) Stellar spectra

OR

Describe the formation of P-type and N-type semiconductors. Also, explain the working of a PN-junction diode when it is forward biased and reverse biased.

Attempt ALL the questions.

Group "A"

14

- Resonance is a special case of
 - forced vibrations
 - damped vibrations
 - natural vibrations
 - free vibrations
- If light of low wavelength is used in Young's double slit experiment then width of fringe will
 - decrease
 - increase
 - not fixed
 - unaffected
- When the light is incident on polarizing angle which of the following is completely polarized?
 - reflected light
 - refracted light
 - transmitted light
 - both (a) and (b)
- The noise level in ordinary conversation is
 - 20 dB
 - 65 dB
 - 100 dB
 - 120 dB
- The capacitance of a parallel plate capacitor depends on
 - the type of metal used.
 - the thickness of plates
 - the potential applied across the plates
 - the separation between the plates
- Conductivity is the
 - reciprocal of current density
 - reciprocal of resistivity
 - reciprocal of resistance
 - same as current
- The wavelength of uv-rays is of the order of
 - 10^{-3} m
 - 10^{-6} m
 - 10^{-9} m
 - between 'b' and 'c'
- The magnetic field due to a long straight wire carrying a current I is proportional to
 - I
 - \sqrt{I}
 - I^2
 - $\frac{1}{I}$
- The magnetic materials having negative magnetic susceptibility are
 - non-magnetic
 - paramagnetic
 - diamagnetic
 - ferromagnetic
- Which one of the following is energy of a photon of wavelength λ ?
 - $hc\lambda$
 - hc/λ
 - λ/hc
 - λ/hc
- The depletion layer in a pn-junction is caused by
 - drift of holes
 - diffusion of charge carriers
 - migrations of impurity atoms
 - drift of electrons
- A hole in a p-type semiconductor is
 - an excess electron
 - a missing electron
 - a missing atom
 - a donor level
- Hubble law is based on
 - law of gravitation
 - Doppler's effect
 - Stefanis law
 - Wien's law
- Eddy current do not cause
 - damping
 - heating
 - sparking
 - energy loss

(d) Physics IIII (Sc. Ed. 336) Elective Group B

Exam 2068

Group "A"

14

- The efficiency of a car engine is
 - 75%
 - 60%
 - 45%
 - 25%
- Which one of the following given conversions is correct?
 - secondary \rightarrow end use \rightarrow functional energy
 - secondary \rightarrow functional \rightarrow end use
 - primary \rightarrow functional \rightarrow end use
 - primary \rightarrow ends use \rightarrow secondary
- Cathode rays can be deflected by
 - magnetic field only
 - electric field only

- c. both magnetic and electric fields
d. zero fields
4. The quark combination of proton is
a. uud
b. ddu
c. uuc
d. uu \bar{d}
5. In Millikan's oil drop experiment, once the oil drop reaches its terminal velocity, it
a. has no acceleration
b. has acceleration
c. has zero velocity
d. has uniform acceleration
6. Photoelectric cell converts
a. electric energy into light energy
b. light energy into electric energy
c. light energy into heat energy
d. heat energy into light energy
7. Which of the following are electromagnetic waves?
a. γ - rays
b. β - rays
c. α - rays
d. positive rays
8. The main source of solar energy is
a. nuclear fission
b. nuclear fusion
c. chemical reaction
d. gravitational contraction
9. The density of nucleus is of the order of
a. 10^3 kg m^{-3}
b. $10^{12} \text{ kg m}^{-3}$
c. $10^{17} \text{ kg m}^{-3}$
d. $10^{24} \text{ kg m}^{-3}$
10. 1 atomic mass unit (amu) is equivalent to
a. 1 kg
b. 931 MeV
c. 931 KeV
d. 931 eV
11. The unit of impedance is
a. Ohm
b. Siemen
c. Henry
d. Farad
12. The resonant frequency of an LCR series circuit is
a. $2\pi\sqrt{LC}$
b. $2\pi RC$
c. $\frac{R}{2p\sqrt{LC}}$
d. $\frac{1}{2p\sqrt{LC}}$
13. When an input signal 1 is applied to a NOT gate, its output is
a. 1
b. 0
c. either 0 or 1
d. any positive value
14. The principle used for the transmission of light signals through the optical fiber is
a. reflection
b. refraction
c. diffraction
d. total internal reflection
- Group "B"
- 6 × 7 = 42

Attempt ALL the questions:

1. Explain the terms 'high grade' and 'low grade' energy with examples. What is meant by the statement 'the entropy of the universe is increasing'?
 2. What is solar constant? Explain the factors on which the amount of solar radiation received at any point on the earth's surface depends.
- OR,
- The human body is about 25% efficient at converting chemical energy into mechanical energy. If someone develops a power output of 500 watt when running up a flight of stairs, what is the power input to the body?
3. Describe with necessary theory Thomson's method of determining the ratio of the charge to the mass (e/m) of an electron.
- OR,
- Define photoelectric effect. Write down Einstein's photoelectric equation and explain the different terms involved in it.
4. What is nuclear fusion? Describe how energy is released in nuclear fusion.
 5. Derive an expression for the impedance of an LCR series circuit.
 6. Give the logic symbol and truth table for AND gate. Explain with the help of a circuit diagram how this gate is realized in practice.
- Group "C"
- 2 × 12 = 24
7. Define the decay constant and half life of radioactive substance and establish a relation between them. Mention the uses of radioactivity.
 8. What is laser? Describe the working of He-Ne laser. Write the uses of laser.
- OR,
- Describe how as a science teacher you will undertake a study on "secondary level physics teaching in a urban private school and a public school."

Exam 2069

Group "A"

Attempt all the questions. Tick (✓) the best answers

1. One KWh is equivalent to
a. $3.6 \times 10^6 \text{ J}$
b. $6.3 \times 10^3 \text{ J}$
c. $1.6 \times 10^9 \text{ J}$
d. $6.7 \times 10^{-7} \text{ J}$

2. The maximum efficiency of a thermal power station is given by
 - a.
 - b.
3. Which of the following is the renewable source of energy?
 - a. coal
 - b. natural gas
 - c. bio fuels
 - d. nuclear fuels
4. Electric conduction takes place in a discharge tube due to movement of
 - a. protons only
 - b. electrons and protons
 - c. electrons and positive ions
 - d. negative ions and proton
5. Which of the following will deflect in electric field
 - a. γ -rays
 - b. X-rays
 - c. UV rays
 - d. cathode rays
6. The energy of a photon is given by
 - a. $h\nu$
 - b. $hc\lambda$
 - c. $\frac{h}{\nu}$
 - d. $\frac{u}{h}$
7. The half life period of a radioactive sample depends upon
 - a. temperature
 - b. pressure
 - c. nature of substance
 - d. nature of container
8. The phenomenon of synthesis of two lighter nuclei into heavier ones is called
 - a. nuclear fission
 - b. nuclear fusion
 - c. mass defect
 - d. radioactivity
9. The nuclear radius of mass number A is given by
 - a. $R=1.2 \times 10^{-15} A$ metre
 - b. $R=1.2 \times 10^{-15} A^{2/3}$ metre
 - c. $R=1.2 \times 10^{-10} A^{1/3}$ metre
 - d. $R=1.2 \times 10^{-15} A^{1/3}$ metre
10. Alternating current is the current which
 - a. stability
 - b. mass
 - c. charge
 - d. momentum
11. Alternating current is the current which
 - a. changes the magnitude only
 - b. changes in direction only
 - c. change both in magnitude and direction
 - d. neither changes in magnitude nor direction
12. In a series resonant circuit, the current at resonance is
 - a. maximum
 - b. minimum
 - c. zero
 - d. sometimes maximum sometimes minimum
13. By combining an AND gate and a NOT gate, we get a
 - a. NOR gate
 - b. NAND gate
 - c. OR gate
 - d. EXOR gate
14. The principle used for transmission of light signals through the optical fibre is
 - a. reflection
 - b. refraction
 - c. diffraction
 - d. total internal reflection

Attempt all the questions.

Group "B"

6×7=42

1. Describe different units of energy used in energy industry.
2. What are energy converters? Show with the help of energy flow diagram the conversion of energy in a car engine.

OR

- Describe the factors on which the prediction of future fuels can be made.
3. What are cathode rays? Write the properties of cathode rays.
 4. What is mass defect? Discuss Einstein's mass energy relation.

OR

- What are nuclear reactions? Write with examples. Describe the Q-value of nuclear reaction.
5. Define nuclear fission. Describe how energy is released in nuclear fission.
 6. Describe resonance phenomenon in LCR series circuit and calculate resonant frequency.
- Group "C" 2×12=24
7. What are energy sources? Explain the main environmental implications of using as an energy source (a) fossil fuel (b) nuclear fuel, and (c) hydroelectric power.

8. Describe with necessary theory Millikan's oil drop experiment to determine the value of the charge associated with an electron. Write the significance of this measurement.

OR

Explain the life history of a reknown physicist of your interest describing his/her childhood education, research, achievement, award etc. Also give your critical view.

Exam 2071

Group "A"

14

Attempt ALL the questions. Tick (✓) the best answers.

- Which of the following is Unit of energy?
 - Newton-Joule
 - NTC
 - Btu
 - KKU
- In general, the efficiency of a large electric generator is
 - 90%
 - 60%
 - 45%
 - 25%
- The most important characteristics of fuel is
 - energy density
 - energy volume
 - cheapness
 - state
- The relation between power developed by a wind turbine and velocity (v) of wind is
 - $P \propto v^3$
 - $P \propto v^2$
 - $P \propto v$
 - $P \propto v^5$
- Which of the following is true for cathode rays?
 - they travel in a curved path
 - they are electromagnetic waves
 - they have kinetic energy
 - they are not deflected by electric field
- The quark combination of neutron is
 - uud
 - ddu
 - uuc
 - u-d-d
- The specific charge of an electron is
 - $1.75 \times 10^{11} \text{ C kg}^{-1}$
 - $1.62 \times 10^{-19} \text{ C kg}^{-1}$
 - $9.1 \times 10^{-31} \text{ kg}$
 - $1.6 \times 10^{-19} \text{ C}$
- CRO stands for
 - carbon radio ornament
 - cathode rays oscilloscope
 - chemical radioactive oscilloscope
 - chem reading organisation
- Half life of a radioactive material depends on
 - temperature
 - nature of material
 - amount of material
 - surrounding medium
- An alpha particle has
 - a mass equal to that of a neutron
 - a mass equal to that of an electron
 - high penetrating capacity than gamma rays
 - high ionising capacity than a beta particle
- 1 amu is equal to
 - 1 eV
 - 31 MeV
 - 931 KeV
 - 319 MeV
- The mass density of a nucleus varies with mass number A as
 - A^2
 - A
 - A^{-1}
 - constant
- The resonant frequency of an LCR series circuit is
 - $2\pi \sqrt{LC}$
 - $\frac{1}{2\pi \sqrt{LC}}$
 - $2\pi \sqrt{RC}$
 - $\frac{1}{2\pi \sqrt{RC}}$
- The only function of a NOT gate is to
 - stop a signal
 - invert at input signal
 - recomplement a signal
 - act as a universal gate

Attempt ALL the questions.

Group "B"

6×7=42

1. Explain the terms - finite energy sources and energy density with suitable examples. If energy is conserved, explain why there is an energy crisis in future.

2. What are energy converters? Show with the help of energy flow diagram the conversion of energy in an electric motor.

OR

What are fuels? Describe different characteristics of fuels.

3. Explain necessary theory of J. J. Thomson's method for determining the specific charge (e/m) of an electron.
4. Discuss mass defect and binding energy of a nucleus with examples.

OR

Assuming that four protons combine to form a helium atom and two positrons of mass 0.000549 amu. Calculate the energy released. Given mass of proton (${}^1\text{H}^1$) = 1.007825 amu and mass of helium (${}^4\text{He}^4$) = 4.002603 amu.

5. What is resonance in LCR series circuit? Obtain an expression for resonant frequency.
6. Define logic gates. Explain OR and AND gates with their symbols, operations and truth tables. 2×12=24
7. Describe the discharge of electricity through gases at gradually decreasing pressures. What are the positive rays? Write the properties of positive rays.
8. State the laws of radioactive disintegration. Derive a relation between half life and decay constant. Also, compare the properties of α and β particles.

OR

Suppose if you have to inspect the science teaching in a high school, outline the procedures you would adopt as an example of it.

Exam 2072

Group "A"

14

Attempt ALL the questions. Tick (V) the best answers.

1. Which of the following is the renewable source of energy?
a. coal
b. oil
c. nuclear
d. bio-fuels
2. The efficiency of a car engine is
a. 75%
b. 60%
c. 45%
d. 25%
3. Solar cell converts
a. electric energy into light energy
b. light energy into electric energy
c. light energy into heat energy
d. heat energy into light energy
4. The main characteristic of good fuel is
a. high energy density
b. low price
c. large volume
d. solid form
5. X-rays are
a. stream of electrons
b. stream of neutral particles
c. stream of positive ions
d. electromagnetic radiation
6. The quark combination of proton is
a. uud
b. ddu
c. uuc
d. $\bar{d}uu$
7. The specific charge ($\frac{e}{m}$) of an electron is
a. $1.62 \times 10^{10} \text{ C kg}^{-1}$
b. $1.75 \times 10^{11} \text{ C kg}^{-1}$
c. $9.1 \times 10^{-19} \text{ C kg}$
d. $1.6 \times 10^{-19} \text{ C}$
8. A superconductor has resistance
a. equal to that of conductor
b. equal to that of semiconductor
c. equal to zero
d. equal to 100 ohm
9. Half life of a radioactive material depends on
a. temperature
b. amount of material
c. nature of material
d. surrounding medium
10. Which one of the following has maximum power of penetration
a. α - particles
b. β - particles

- c. γ - rays
 11. The main source of solar energy is
 a. nuclear fusion
 c. chemical reaction
 12. 1 amu is equivalent to
 a. 431 MeV
 c. 12KeV
 13. If θ be the phase angle between the current and voltage in an ac circuit, the power factor is
 a. $\sin \theta$
 c. $\tan \theta$
 14. When an input signal 1 is applied to a not gate, its output signal is
 a. 1
 c. sometimes 0, sometimes 1
- d. electrons
 b. nuclear fission
 d. gravitational contraction
 b. 365 MeV
 d. 931 MeV
 b. $\cos \theta$
 d. $\cot \theta$
 b. 0
 d. any positive value

Attempt ALL the questions.

Group "B"

6×7=42

1. Explain the terms conservation and degradation of energy with suitable examples. If energy is conserved, why is there an energy crisis?
 2. Describe energy density of a fuel with examples. How does the size of the energy converter depend on it?

OR

A single-glazed window 6mm thick measures 2m by 1m and has U-value $5.6 \text{ Wm}^{-2}\text{K}^{-1}$. Calculate the power loss through it when the inside and outside temperatures are 18°C and -3°C .

3. Name and explain briefly the fundamental forces of nature.
 4. What is mass defect? Discuss Einstein's mass energy relation.

OR

Define nuclear fusion. Describe how energy is released in nuclear fusion.

5. Describe resonance phenomenon in LCR series circuit and calculate resonant frequency.
 6. What are logic gates? Explain OR and AND gates with their symbols, operations and truth tables.

Group "C"

2×12=24

7. Describe necessary theory of Millikan's oil drop experiment to determine the value of charge associated with an electron. Also write the conclusions drawn from the experiment.

OR

Define the decay constant and half life of a radioactive substance and establish a relation between them. Compare the properties of α and β particles.

8. Describe the life history and contribution to physics study of a physicist.

(e) Biology (Zoology) (Sc. Ed. 334) Elective Group A

Exam 2068

Group "B"

3×7 = 21

Attempt ALL the questions:

1. Write down a brief history of animal cell culture and give the requirements necessary for it.
 OR, Differentiate pathogen and parasite. Describe life history of trichuris, disease caused by it and its preventive measures.
 2. Write down the human ancestors and the gradual evolutionary changes that has occurred in modern man.
 3. What is bio-fertilizer? Write down its importance for agricultural land.

Group "C"

12

4. Differentiate taxonomy and nomenclature. Write down the necessity of ICZN. Explain ecological and morphological approach of taxonomy.
 OR, How is the sex determined through genetical mechanism? Write down the importance of eugenics for the human betterment.

Group "A"

7

1. System of plant classification process by Hutchinson was
 a. Artificial system b. Natural system c. Phylogenetic system d. Sexual system
 2. The genus *Michelia* belongs to the family
 a. Verbenaceae b. Magnoliaceae c. Scrophulariaceae d. Convolvulaceae

- The classification of Angiosperms into Dicotyledous and Monocotyledons is based on
a. anatomical character b. cytological character
c. embryological character d. external morphological character
- Black rot of crucifer is a
a. Viral disease b. Fungal disease
c. Bacterial disease d. Mycoplasma disease
- Nucleolus takes part in the synthesis of
a. DNA b. mRNA c. tRNA d. rRNA
- T. Murashige is associated with
a. mutagenesis b. cloning c. tissue culture d. hybridization
- The cotton fibers from cotton plant is obtained from
a. roots b. stems c. leaves d. seed coat

Exam 2069

Attempt all the questions.

Group "B"

3×7=21

- Differentiate api-culture and vermi* culture. Write down their economic importance.
- Write down the evolutionary history of modern man.

OR

Discuss the life history of liver fluke, disease caused by it and its prevention

- What is a clone? Explain the significance of cell cloning.

Group "C"

12

- What is binomial nomenclature? Explain the morphological, ecological and embryological approach of taxonomy.

OR

Differentiate eugenics and euthenics. Describe the methods of eugenics used for the betterment of human race.

Group "A"

20

Attempt all the questions. Tick (✓) the best answers

- Which of the following is the first step in taxonomic studies?
a. Description b. Naming
c. Identification d. Classification
- Which of the following "causes" epigastric pain?
a. Amoeba b. Trypanosome
c. Giardia d. Virus
- Eugenics is the science dealing with
a. the effect of radiation on man b. the cancer causing agent in man
c. the improvement of the race of mankind d. the blood groups in man
- Which one of the insect's product is used mostly by jewellers and Goldsmith?
a. Apis b. Antheraea
c. Tachardia d. Attacus
- Determination of sex of a child depends upon
a. health of father b. nature of egg
c. health of mother d. nature of sperm
- Which of the following possesses smallest cranial cavity?
a. Neanderthal b. Cro-magnon
c. Java-man d. pecking-man
- The term 'gene' refers to
a. a linkage group b. a part of RNA
c. sequence of amino acid d. a part of DNA

Exam 2071

Group "A"

7

Attempt ALL the questions. Tick (✓) the correct answers.

- The cell organelle that provides mechanical support to cell is
a. Ribosome b. Lysosome
c. Golgi bodies d. E. Reticulum
- Which animal's product can be used in cosmetic field?

- a. ant
c. flat worm
3. The sudden appearance of new features due to chromosomal change is called .
a. mutagen
c. mutation
4. A study of heredity and hereditary characters is called as
a. Genetics
c. Eugenetics
5. Ancylostoma is the scientific name of
a. tapeworm
c. whipworm
6. The basic unit of classification is
a. variety
c. family
7. The first mammalian clone was born in
a. 1995
c. 1996
- b. silk-worm
d. bee
- b. mutant
d. myetin
- b. Eugenics
d. Euthenics
- b. bookworm
d. hookworm
- b. genus
d. species
- b. 1991
d. 1998

Attempt ALL the questions.

Group "B"

Time: 1 1/2 hrs.

3×7=21

1. Write down the purpose of collection of specimen and their preservative value.
OR
2. Define taxonomy. Explain the ecological approaches in taxonomy.
3. Explain the economic importance of birds and fishes.
3. How do bio-fertilizers help agriculture? Write in detail.
Group "C"
4. Classify mutation according to the mode of origin. Describe the causes of mutation and its significance.
12
- OR
- Describe and differentiate the different application of eugenics and euthenics for the improvement of human race.

(f) Biology (Botany) (Sc. Ed. 334) Elective Group A

Exam 2069

Group "A"

7

Attempt all the questions. Tick (✓) the correct answers.

1. Which system of plant classification is based on phylogeny?
a. Linnaeus
c. Bentham and Hooker
2. Wart disease of potato is caused by
a. Pythium
c. Phytophthora infestans
3. A nucleoside consists of
a. a pentose sugar and phosphate group
c. phosphate group and nitrogenous base
d. a nitrogenous base, pentose sugar and phosphate group
4. Eukaryotic 80 S ribosome's have two subunits of
a. 40 S+40 S
c. 60 S+40 S
5. Which term is used if a piece of chromosome breaks off and gets lost?
a. Duplication
c. Inversion
6. Correct sequence in the hierarchy of taxonomic categories is
a. Genus, family, species, order, class
c. family, class, genus, species, order
7. Genus Zanthoxylum belongs to the family
a. Verbenaceae
c. Rutaceae
- b. A.P. de Candolle
d. Hutchinson
- b. Puccini
d. Synchytrium endobioticum
- b. a pentose sugar and nitrogenous base
- b. 50 S+30 S
d. 50 S+ 50 S
- b. Deletion
d. Translocation
- b. Class, family species, genus, order
d. Species, genus, family, order, class
- b. Scrophulariaceae
d. Amaranthaceae

Group "B"

Attempt all the questions.

1. What is a herbarium? Explain its roles in plant taxonomy.
2. Describe the symptoms, causal organism and control measures of blast disease of rice.

OR

Describe an experiment to prove that DNA is a genetic material.
What is biotechnology? Explain its Achievements in agriculture.

OR

Explain the importance of fibre yielding plants of Nepal.

Group "C"

4. What are chromosomal aberrations? Describe different types of chromosomal aberrations which occur during meiosis.

OR

Describe the taxonomic characteristics features of the family Verbenaceae with floral formula, floral diagram and affinities. Also give scientific names of two plants belonging to this family.

Exam 2071

Group "A"

7

Attempt ALL the questions. Tick (✓) the correct answers.

1. Which system of classification is based on phylogeny?
a. Linnaeus
b. Bentham and Hooker
c. A.P. de Candolle
d. Hutechinson
2. The Purine bases found in DNA are
a. Adenine and Cytosine
b. Adenine and Guanine
c. Cytosine and Thymine
d. Adenine and Uracil
3. Virus free plants can be produced by
a. shoot tip culture
b. root tip culture
c. meristem culture
d. callus culture
4. Proteins are synthesized at
a. mitochondria
b. golgi bodies
c. nucleus
d. ribosomes
5. Wart disease of potato is caused by
a. Phytophthora infestans
b. Attermaria solani
c. Cercospora
d. Synchytrium endobioticum
6. Mompridica belongs to the family
a. Convolvulaceae
b. Ameranthaceae
c. Cucurbitaceae
d. Verbenaceae
7. Ribosomes in eukaryotes exist as
a. 30s units
b. 50s units
c. 70s units
d. 80s units

Attempt ALL the questions.

Group "B"

3×7=21

1. List the modern trends in plant taxonomy and explain any one of them.
2. Explain the structure and functions of mitochondria.

OR

What is biotechnology? Briefly discuss the application of biotechnology in agriculture.
3. Describe the symptoms, causal organism and control measures of Black rot of crucifers.

OR

List five timber trees of Nepal With their scientific names and explain their economic values.

Group "C"

12

4. What are chromosomal aberrations? Describe with suitable sketches the different types of chromosomal aberrations.

OR

Describe the taxonomic characters of family Magholiaceae with floral formula, floral diagram and affinities. Also give scientific names of two plants belonging to this family.

Biology (Botany) (Sc.Ed.334) Elective II

The figures in the margin indicate full marks.

Group "B"

3x7=21

Attempt ALL the questions.

1. What is a herbarium? Explain its roles in plant taxonomy.
2. Describe the symptoms, causal organism and control measures of Black rot of Cricofers.

OR

3. Describe an experiment to prove that DNA is a genetic material.
3. What is tissue culture? Why meristem culture is beneficial to us? Explain.

OR

Write the scientific names and uses of the following plants:

- a. Jethi Madhu
- b. Timur
- c. Karela
- d. Alaichi
- e. Nim

Group "C"

4. What are chromosomal aberrations? Describe different types of chromosomal aberrations which occur during meiosis.

OR

Describe the taxonomic characters of the family Verbenaceae in semi-technical terms with its floral formula and floral diagram. Also mention two genera belonging to this family.

(g) Environmental Education (Sc. Ed. 338) Interdisciplinary

Exam 2068

Group "A"

14

1. The Intergovernmental Conference of Environmental Education organized by UNESCO was held in
a. Paris b. Tbilisi c. Stockholm d. Belgrade
2. The major layer of atmosphere which is in direct contact with earth is
a. Troposphere b. Stratosphere c. Mesosphere d. Thermosphere
3. An example of sedimentary cycle is
a. carbon cycle b. nitrogen cycle c. phosphorus cycle d. hydrological cycle
4. Which one is a renewable resource of energy?
a. natural gas b. coal c. diesel d. biogas
5. An example of lentic environment is
a. stream b. spring c. river d. pond
6. Macrobiota include
a. soil bacteria b. soil fungi c. unicellular animals d. roots of plants
7. Which of the following is the another name of World Conservation Union?
a. UNEP b. ICIMOD c. IUCN d. UNDP
8. When was National Conservation Strategy (NCS) implemented for the first time in Nepal?
a. 1981 AD b. 1991 AD c. 1998 AD d. 2001 AD
9. The conversion of nitrates into gaseous nitrogen is called
a. nitrification b. nitrogen fixation c. denitrification d. ammonification
10. An example of secondary air pollutant is
a. sulphur dioxide b. sulphur trioxide c. carbon dioxide d. nitric oxide
11. An example of bacterial disease is
a. Chicken pox b. Measles c. Diphtheria d. Mumps
12. In Hindu religion Eagle is associate with God
a. Bramha b. Indra c. Vishnu d. Shiva
13. The Ministry of Population and Environment in Nepal was established in
a. 1992 AD b. 1993 AD c. 1994 AD d. 1995 AD
14. Marble is an example of
a. igneous rock b. sedimentary rock c. plutonic rock d. metamorphic rock

Group "B"

6x7=42

Attempt ALL the questions:

1. What is environmental education? Briefly explain its importance in Nepal.
2. Explain soil profile with well labeled diagram.

- Draw a neat and well labeled diagram of nitrogen cycle (description not needed).
- Explain the importance of forest resources in context of Nepal.
- OR, Explain Greenhouse effect in terms of causes and effects on the environment.
- Write the mode of transmission, symptoms and control measures of Diphtheria.
- OR, What is cultural heritage? Explain the treats to our cultural heritage.
- Describe in short the role of IUCN in conserving environment in Nepal.

Group "C"

2 × 12 = 24

- Define ecosystem. Describe various components of a pond ecosystem.
- What is water pollution? Explain the sources and effects of water pollutants in the environment and human health.
- OR, What is atmosphere? Explain the phisico-chemical structure of atmosphere.

Exam 2069

Group "A"

14

- The UN Conference on Human Environment was first held in
a. Paris b. Berlin c. Stockholm d. New York
- Which of the following does humus of soil contain?
a. microbes b. inorganic c. pH d. organic matter
- The dominant elements of exosphere is
a. nitrogen b. hydrogen c. ozone d. oxygen
- An example of lotic environment is
a. lake b. pond c. spring d. marshy place
- Which one of the following is an endangered animal of Nepal?
a. Blue sheep b. Red panda c. Wild boar d. Barking deer
- Which of the below given can be identified as primary consumer
a. Phytoplankton b. Zooplankton c. Lizard d. Snake
- The conversion of gaseous nitrogen into nitrate is called
a. nitrification b. denitrification c. nitrogen fixation d. ammonification
- Which one of the following is the cause of acid rain?
a. Chlorofluorocarbon b. Methane c. Sulphur dioxide d. Carbon dioxide
- Koshi Tappu wildlife Reserve is well known for
a. Swamp deer b. wild buffalo c. blue sheep d. barking deer
- Which one of the following is a bacterial disease
a. Carbon dioxide b. Sulphur dioxide c. Ammonia d. Ozone
- Which one of the following is a bacterial disease
a. Measles b. Mumps c. Chicken pox d. diphtheria
- Which of the following is non-renewable energy source?
a. Biogas b. Coal c. Wind energy d. Tidal energy
- In Hinduism, tortoise is associated with Goddess
a. Ganga b. Yamuna c. Laxmi d. Saraswati
- World Environment Day is Celebrated on
a. May 5 b. June 5 c. July 5 d. August 5

Group "B"

6 × 7 = 42

Attempt ALL the questions:

- List five guiding principle of environmental education.
- What do you understand by 'endangered species'? Write the names of any ten endangered fauna of Nepal.
- Explain the role of food web in an ecosystem.
- Explain carbon cycle.
- Explain the importance of alternative sources of energy in context of Nepal.
- OR, Explain acid rain in terms of causes and effects on the environment.
- Write the mode of transmission, symptoms and control measures of Pneumonia.
- OR, Explain the efforts made by NGO's in the environmental management in Nepal.

2 × 12 = 24

Group "C"

- Describe various components of a grassland ecosystem.
- What is land pollution? Explain the sources and effects of land pollution on human health and environment.
- OR, What is soil? Explain the various processes of soil formation from the parent rocks.

Exam 2070**Group "A"**

14

- Which of the following does humus of soil contain
a. Microbes b. inorganic particles c. pH d. organic matter
- An example of bacterial disease is
a. chicken pox b. measles c. diphtheria d. mumps
- The dominant element of exosphere is
a. nitrogen b. hydrogen c. ozone d. oxygen
- Macrobiota include
a. soil bacteria b. soil fungi c. unicellular animals d. roots of plants
- An example of lotic environment is
a. lake b. pond c. spring d. marshy place
- Which of the following is an example of primary consumer
a. grass b. goat c. tiger d. snake
- Which of the following is non-renewable energy source
a. biogas b. coal c. wind energy d. tidal energy
- The Minister of Pollution and Environment in Nepal was established in
a. 1992 AD b. 1993 AD c. 1994 AD d. 1995 AD
- In Hinduism, fish is associated with God
a. Ganesh b. Sun c. Kama d. Ram
- Koshi Tappu Wildlife reserve is well known for
a. blue ship b. red panda c. swamp deer d. barking deer
- The relationship existing between sea anemone and Hermit crab is called
a. mutualism b. commensalism c. symbiosis d. predation
- An example of precious stone is
a. pumice stone b. rubies c. marble chiefs d. rock stone
- The interlocking pattern of feeding system in ecosystem is called
a. food web b. food chain c. pyramid d. ecological pyramid
- An example of acid rain is
a. HCl with rain water b. HNO₃ with rain water c. rain water d. H₂CO₃ with rain water

Group "B"

6 × 7 = 42

Attempt ALL the questions:

- Explain the guiding principles of environmental education.
- Describe soil proofing with well labeled diagram.
- What is food web? Discuss the role of food web in ecosystem.
- Draw a neat and well labeled diagram of carbon cycle.
- OR, Define acid rain. Explain its cause of effects on the environment.
- Write the mode of transmission, symptoms and control measures of Diphtheria.
- OR, Elaborate the threats to our cultural heritage.
- Describe the role of IUCN in conserving environment in Nepal.

Group "C"

2 × 12 = 24

- What is water pollution? Explain the causes and effects of water pollution on human health and environment.
- Define and explain the pond ecosystem in environment.
- OR, What is atmosphere? Explain the physico-chemical structure of atmosphere.

Exam 2071**Group "A"**

14

Attempt ALL the questions. Tick (✓) the best answers.

- Which of the following is not a climatic factors
a. light b. weathering c. temperature d. humidity
- The relationship exist between Hermit crab and sea anemone is called
a. mutualism b. commensalism c. symbiosis d. predation
- The major layer of atmosphere which is in direct contact with earth is
a. Mesosphere b. Stratosphere c. Troposphere d. Thermosphere
- An example of hydrological cycle is
a. carbon cycle b. sulphur cycle c. nitrogen cycle d. water cycle

5. Which of the following is a renewable resource of energy
 a. diesel b. natural gas c. biogas d. coal
6. An example of secondary air pollutant is
 a. SO₂ b. SO₃ c. CO d. NO
7. In Hindu religion snake is associated with God
 a. Shiva b. Durga c. Laxmi d. Ganga
8. An example of water born disease is
 a. chickenpox b. dysentery c. mumps d. measles
9. Plumbism disease mainly caused by
 a. lead poisoning b. mercury poisoning c. arsenic poisoning d. cadmium poisoning
10. Marble is an example of
 a. sedimentary rock b. plutonic rock c. igneous rock d. metamorphic rock
11. World Environment Day is celebrated on
 a. May b. June % c. July 5 d. August 5
12. An example of lentic environment is
 a. river b. stream c. spring d. pond
13. Which one of the following is the cause of acid rain
 a. CFC b. SO₂ c. CH₄ d. CO₂
14. The conversion of nitrate into gaseous nitrogen is called
 a. nitrification b. nitrogen fixation c. denitrification d. ammonification

Attempt ALL the questions.

Group "B"

6×7=42

1. Define environment education. List the goals of environmental education.
2. Explain the process of soil formation.
3. Describe the role of food chain and food web in ecosystem.
4. Draw a neat and well labelled diagram of nitrogen cycle.
- OR
5. Explain the importance of water resources in context of Nepal.
6. Elaborate the impact of earthquake on human life and economy.
- OR
7. What is Green house effect? Explain its causes and effects on the environment.
8. Give the causes and effects of poor sanitation on human health and environment.

Group "C"

2×12=24

7. Discuss the measures and conservation of cultural heritage in Nepal.
8. Define ecosystem. Explain the various component of grassland ecosystem.
- OR
9. What is air pollution? Explain the sources and effects of air pollution in the environment and human health.
- OR
10. Explain the adaptations of plants in the biosphere

Exam 2072

Group "A"

14

Attempt ALL the questions.

Tick (✓) the best answer.

1. An example of positive interactions is
 a. symbiosis b. antagonism c. competition d. parasitism
2. The uppermost layer of the soil profile is called
 a. D - Horizon b. A - Horizon c. B - Horizon d. C - Horizon
3. Which of the following is an example of tertiary consumer in a grassland ecosystem?
 a. snake b. lizard c. hawk d. rabbit
4. The autotrophic organisms are also called
 a. decomposer b. consumers c. detritivores d. producers
5. The amount of carbon dioxide in the atmosphere is
 a. 0.03% b. 0.3% c. 0.04% d. 0.4%
6. of the following is raw material of cement?
 a. Mg CO₃ b. Ca CO₃ c. Na₂ CO₃ d. Cu CO₃
7. Pinus walllichiana is found in
 a. Tropical forest b. Alpine forest c. Temperate forest d. Hardwood forest

